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American Foundryman

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HARDNESS TESTING IN A STEEL FOUNDRY (Courtesy Sivyer Steel Casting Co., Milwaukee Wis.)

What Price Industrial Hygiene? See Inside Front Cover. International Foundry Congress Plans, See Page 2. Open House Held by Saginaw Malleable, See Page 4.

January
1939

What Price Industrial Hygiene



ONLY a few years ago industry was confronted with numerous occupational disease lawsuits, alleging health disability because of some exposure due to working conditions. The defense of these suits and the resulting awards, settlements, or dismissal was extremely costly in many instances, either to the foundry or to the insurance carrier.

Many individuals identified with the foundry industry as well as the Safety and Hygiene Section of the American Foundrymen's Association and its various policy committees in the several states have accomplished a great deal in combating the situation by actively supporting or aiding in the development of reasonable state compensation legislation or industrial hygiene codes covering occupational diseases arising out of and in the course of employment.

All of this activity has afforded an opportunity for the mature study of the foundry problem and the development of factual data on occupational hazards. The results now show that the foundry industry is a pretty safe industry to work in after all.

The industry, of course, has hazards that can be very acute, but on the other hand, all operations, processes, or materials used in the industry are amenable to medical and engineering control so that the occupational disease exposure can be reduced to a minimum. Rates for compensation insurance are still high, but probably reflect the need for better control measures in many establishments. Money that foundries are now spending for insurance, ranging from \$2.50 to \$6.00 per \$100 of payroll, can be put to much better use in making the foundries absolutely safe in every respect and at the same time provide for more efficient operation.

Experience has shown that occupational disease compensation can be reduced to at least one cent per \$100 of payroll. Instituting good housekeeping practices, eliminating hazardous equipment and methods, and providing safe facilities will practically eliminate occupational disease, reduce the high cost of compensation, provide better working conditions, and lower operating costs.

Jas. R. Allan

Chairman, Industrial Hygiene Codes Committee.

Jas. R. Allan is a director of A. F. A. and chairman of the Association's committee on Hygiene Codes. Through this committee, Mr. Allan has been instrumental in developing recommended codes of good practice for controlling dust elimination. He holds the position of assistant manager, Industrial Engineering and Construction Division, International Harvester Co., Chicago.

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American Foundryman

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January, 1939

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Entered as second class matter July 22, 1938, at the post office at Chicago, Illinois, under the Act of March 3, 1879.

Plan for 1939 Annual Convention at Cincinnati

THE several committees of the Association working on the program for the 1939 Annual Convention, to be held in Cincinnati May 15-18, report that the program will be exceedingly interesting. The majority of the sessions will be held at the Gibson Hotel where the registration headquarters will be located. Other sessions are to be scheduled for the Netherlands Plaza Hotel.

Without the exhibition, a greater amount of time than usual is to be given to the technical and foundry practice sessions. Beginning with the opening session at 9:30 A. M., Monday, May 15, there are some 32 sessions tentatively scheduled for the week. These are designed to cover through papers and committee reports many of the more recent developments in the malleable, gray iron, non-ferrous and steel casting branches of the industry.

Under the general management classification are the sessions on cost methods, foreman training, materials handling, safety and hygiene, apprentice training, and job evaluation and time study. At the cost session, methods used in the various branches of the industry to determine melting and molding costs will be compared, the material being presented in the form of a committee report. G. S. Stegemerten, superintendent, time study and methods department, East Pittsburgh works of the Westinghouse Electric and Manufacturing Co., will be the speaker on the program of the job evaluation session.

For the Steel Castings Division, a special session on methods of melting is being arranged. This will be in the nature of a symposium on open hearth, electric and converter practices.

A new feature planned for the Annual Convention is a four-session lecture course on the use of the microscope and elementary metallurgy. This will be given by Roy M. Allen, metal-

lurgical consultant, Bloomfield, N. J., who will be remembered for his outstanding paper on the use of the microscope in the foundry, which he presented before the 1931 convention. This paper is being revised and amplified in book form and will be used as the basis of the material for the course.

Another session, new to A.F.A. meetings, will be one on castability or fluidity, testing and control. While a committee has been studying this subject for several years, this will be the first time that an entire session has been devoted to this work, with four papers on castability control testing being presented. A gray iron foundry shop course is being developed by a committee under the chairmanship of P. T. Bancroft, Moline, Ill. Tentative plans indicate this will prove of even more interest

than those of past years, which have proved so popular.

General interest technical sessions will cover pattern making, refractories and sand research. Each division is scheduling a round table luncheon meeting, where informal discussions of current foundry problems can be presented.

The Annual Dinner is scheduled for the evening of May 17, and the business meeting for May 16. Part of the time of the business meeting will be given over to an outstanding lecture which will be the second annual Board of Awards Lecture, the first having been given last year by Chas. P. Hook, president of the American Rolling Mill Co.

A committee of local foundrymen will plan an extensive plant visitation program to the foundries and industrial plants of the Cincinnati territory.

International Foundry Congress Plans For London Conference in June

THE Institute of British Foundrymen has announced tentative plans for the International Foundry Congress to be held in London, June 11 to June 17. The Institute is also arranging a post-convention tour for the American and other overseas delegates.

Through the A.F.A. Committee on International Relations, under the chairmanship of Frank G. Steinebach, editor of *The Foundry*, Cleveland, Ohio, a group trip for the American delegation is being formulated. Those interested are urged to get in touch with Mr. Steinebach, who will supply details as to the trip. This will be the first International Congress held in London since 1929, at which time a large delegation went from this country and were extensively entertained throughout the various foundry cities by the I.B.F.

The tentative plans call for the delegation to arrive in London June 9 or 10, with the con-

ference opening on June 13, with lectures and the reading of conference papers occupying the attention of the delegates through Thursday, June 15. Friday, June 16, will be given over to plant visitation to foundries in the London area. The conference closes on the 16th with an excursion to Windsor. During the week a special program of social gatherings and visits to places of interest will be arranged for the ladies.

Works Visits

Works visits being planned during the conference week will include the plants of the following firms:

Sterling Manufacturing Co., Ltd. (Merchandise foundry and modern enameling shop);

J. & E. Hall, Ltd. (Refrigerating apparatus and lifts);

R. & A. Main, Ltd. (Gas stove manufacturers);

Belling & Co., Ltd. (Electric cookers);

AMERICAN FOUNDRYMAN

Manganese Bronze and Brass Co., Ltd. (Manganese bronze propellers);

Gillett & Johnston, Ltd. (Bell founders);

Fry's Die Castings, Ltd. (Die casters and non-ferrous founders);

Ford Motor Co., Ltd. (Dogenham plant);

Bagshawe & Co., Ltd. (Malleable iron castings).

Two post-conference tours are being planned, the first listed as "A," beginning June 19 and lasting to June 24, covering Birmingham, Derby, Stanton Iron Works (near Nottingham), Sheffield and Manchester.

On this tour the delegates will be entertained at dinners sponsored by the various branches of the Institute of British Foundrymen.

Those who wish to will continue on Tour "B," which lasts through June 30, and includes trips to the English lake regions, Glasgow, with an excursion down the River Clyde, Edinburgh, and Newcastle-upon-Tyne, returning to London on June 30. A large number of the outstanding English and Scottish foundries will be open for inspection on these two tours.

A detailed program is to be made available to A.F.A. members later.

E. V. Ronceray 1869-1938

EUGENE VICTOR RONCERAY, honorary member of A.F.A., died at his home at Thiais, France, December 5, 1938. Mr. Ronceray was one of the most prominent foundrymen of France, being internationally known for his development of molding machines, his contribution to foundry technical literature and his interest in foundry education, having been the founder and at his death was honorary director of the famous French Foundry Technical School. He was also president of Bonvillain and Ronceray, makers of molding machines.

An officer of the Legion of Honor, he had been recognized

in 1926 by the A.F.A. with the Whiting Gold Medal and honorary membership for his contributions to the foundry industry. He was also honorary member of



E. V. Ronceray

the Institute of British Foundrymen and the Czechoslovakian Foundry Association and honorary president of the French Foundry Technical Association.

Mr. Ronceray was especially well known in this country, being a charter member of the A.F.A., and was one of a few world foundrymen who helped organize the movement to hold international foundry congresses and to have the various associations exchange technical papers. He presented several papers before the A.F.A., visting this country on various occasions.

His first paper before the A.F.A. was at the convention in 1907. Later he developed the idea of pouring large castings without risers, using pencil sized gates. In his factory he developed the hydraulic squeeze machine to its greatest perfection.

Mr. Ronceray was born November 15, 1869, and took his engineering degree in 1891 at the Ecole Nationale des Arts et Metiers of Chalons.

C. S. Koch

IT is with deep regret that the Association announces the death on December 17 of its twenty-first president, Carlton S. Koch. The passing of Mr. Koch, who had served the Association so well over the many years since 1909 when he became a member, will be regretted by all.

A native of Buffalo, N. Y., he was graduated from the school of mining and metallurgy of the

Massachusetts Institute of Technology in 1898, and served as instructor in metallurgy at that institute the following year. In 1899 Mr. Koch entered the foundry business with Wm. Sellers & Co., Philadelphia, later becoming superintendent of the foundry. He left that company to become assistant manager of the Titusville plant of the American Radiator Co. In 1903 he was made manager of the Franklin plant of the American Steel Foundries, later becoming manager of the Sharon works of that company. During 1906 Mr. Koch organized the Fort Pitt Steel Casting Co., McKeesport, Pa., becoming president and general manager, a position which he has held since that date, with the exception of the year 1918, during which he was one of the few civilians in an executive capacity with the Ordnance Department of the U. S. Army,



C. S. Koch

when he had charge of all matters pertaining to steel castings during this period.

As a result of his interest in Association work, he was elected president for the 1919-1920 term, made an honorary member in 1920, and served on the Board of Directors for several years. In addition to his membership in the A.F.A., Mr. Koch was a member of several other national technical and industrial associations.

Because of his many likeable qualities and kindness, he will be greatly missed by his host of friends and acquaintances in the industry.

Open House Held By Saginaw Malleable

THE completion of a new personnel building for the Saginaw Malleable Iron Division of the General Motors Co. at Saginaw, Mich., was considered by the management an excellent opportunity to hold an "Open House." It was realized that many people in and around Saginaw had never been in a foundry and it was decided to open the plant to the public the week of October 10 to 15. Over 5,000 visitors were shown through the plant, these being from 85 cities in Michigan and 14 other states, and the Province of Ontario.

The guests were greatly impressed with the cleanliness of the plant, its safety and working conditions and the progressiveness of the organization. Guides were given an intensive training relative to the various operations in the plant, the newer developments of product, safety and entire first-aid hospital equipment in the new personnel building. Realizing that it would be quite difficult to carry on a conversation and to explain the operations because of the noise of the shop, a display was set up in the large conference room of the new building, showing in detail

the entire operation procedure, carrying it through step by step from inception to the finished casting. Here they also showed the new developments in iron, safety exhibits, and plant activities.

Five-Day Program

The open house started on Monday, October 10, with a luncheon at a local hotel, honoring the signers of the note that purchased the land on which the plant stands. Monday evening was given over exclusively to the employees, their families and friends. The employees were invited to take their guests through the plant at will. In many cases the employee demonstrated his own operations. The luncheon clubs of Saginaw were entertained on Tuesday with the evening being again devoted to the employees, these taking great pride in describing the entire display to their families. The plant was open to the general public on Wednesday, Thursday and Friday, while on Thursday some 150 vocational training teachers were entertained at luncheon and with a tour through the plant.

The special trip through the plant with the guide required an average time of an hour and forty-five minutes. A booklet, "Malleable Iron," given each visitor, was a story of the Saginaw Malleable. The descriptive talk of the guides, the display, the plant trip, the booklet and a movie summed up to a very educational and entertaining open house, and an excellent means of establishing good public relations in the interest of industry as a whole as well as in the special interest of malleable founding and the company.

W. H. Doerfner, a director of A.F.A., is general manager of the Saginaw Malleable Division.

The Saginaw plant was first built in 1917, and a second unit added in 1918. A year later the plant was merged with the General Motors. Entirely revamped in 1925 and 1926, molding conveyors were installed and the duplex system of melting replaced the oil fired furnaces. During the past few years practically every manufacturing operation has been revamped, and the plant is virtually new with a capacity of 900 tons daily.



Old and Young Show Great Interest in Demonstrations During Saginaw Malleable Open House Week.

Chapter Directory



Chicago Chapter

Meetings—2nd Monday, monthly, Medinah Club of Chicago.

Chairman—L. H. Rudesill, Griffin Wheel Co.
Vice-Chairman—C. E. Westover, Burnside Steel Foundry Co.

Treasurer—C. C. Kawin, Chas. C. Kawin Co.
Secretary—L. L. Henkel, Interlake Iron Corp.

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J. D. Burlie, Western Electric Co.

J. J. Fox, Wisconsin Steel Co.

A. W. Gregg, Whiting Corp.,

Harvey, Ill.

H. W. Johnson, Greenlee Foundry Co.

W. C. Packard, National Engineering Co.

W. H. Parker, American Steel Foundries, East Chicago, Ind.

G. P. Phillips, International Harvester Co.

C. O. Thieme, H. Kramer & Co.

James Thomson, Continental Roll & Steel Foundry Co., East Chicago, Ind.

A. W. Weston, Chicago Hardware Foundry Co., North Chicago, Ill.

L. J. Wise, Chicago Malleable Castings Co.

Northeastern Ohio Chapter

Meetings—2nd Thursday, monthly, Cleveland Club, Cleveland.

Chairman—L. P. Robinson, Werner G. Smith Co.

Vice-Chairman—Charles Seelbach, Forest City Foundries Co.

Treasurer—R. F. Lincoln, Osborn Mfg. Co.

Secretary—J. H. Tressler, Hickman Williams Co.

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F. R. Fleig, Smith Facing & Supply Co.

E. F. Hess, Ohio Injector Co., Wadsworth.

D. J. McAvoy, Grabler Mfg. Co.

B. G. Parker, Youngstown Foundry & Machine Co., Youngstown.

Marcel Reymann, Atlantic Foundry Co., Akron.

S. P. Schloss, Superior Foundry Co.

Frank G. Steinebach, The Foundry.

Fred A. Stewart, National Malleable & Steel Castings Co.

Quad City Chapter

Meetings—3rd Monday, monthly, rotate between Davenport, Iowa; Moline, East Moline and Rock Island, Ill.

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Vice-Chairman—H. A. Deane, Deere & Co., Moline, Ill.

Secretary-Treasurer—J. Morgan Johnson, Tri-City Mfrs. Assn., Moline, Ill.

Directors—P. T. Bancroft, Moline, Ill.

H. Bornstein, Deere & Co., Moline, Ill.

C. H. Burgston, Deere & Co., Moline, Ill.

T. J. Frank, Frank Foundries Corp., Davenport, Iowa.

F. O. Gorman, John Deere Spreader Works, E. Moline, Ill.

A. E. Hageboeck, Frank Foundries Corp., Moline, Ill.

H. F. Henninger, International Harvester Co., Rock Island, Ill.

John H. Ploehn, French & Hecht, Inc., Davenport, Iowa.

W. O. McFatrige, International Harvester Co., Rock Island, Ill.

Detroit Chapter

Meetings—3rd Thursday, monthly, Fort Shelby Hotel, Detroit.

Chairman—Ira F. Cheney, Griffin Wheel Co.

Vice-Chairman—Harry W. Dietert, H. W. Dietert Co.

Secretary—Harry J. Deutsch, Aluminum Co. of America.

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R. B. Crawford, Atlas Foundry Co.

J. H. Crawley, Pontiac Motor Co.

L. G. Korte, Atlas Foundry Co.

D. J. Meloche, American Radiator Co.

J. D. Stoddard, Detroit Testing Laboratory.

St. Louis District Chapter

Meetings—2nd Thursday, monthly, St. Louis.

Chairman—J. O. Klein, Southern Malleable Iron Co.

Vice-Chairman—Lee Everett, The Key Co.

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O. J. Belzer, Banner Iron Works.

L. J. Desparois, Pickands Mather & Co.

G. S. Haley, Century Foundry Co.

G. W. Mitsch, American Car & Foundry Co.

L. Reiber, United Collieries, Inc.

Metropolitan Philadelphia Chapter

Meetings—2nd Friday, monthly, Engineers' Club, Philadelphia.

Chairman—H. L. Henszey, The Carborundum Co., Philadelphia.

Vice-Chairman—W. C. Hartmann, Bethlehem Steel Co., Bethlehem, Pa.

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G. L. Coppage, Pusey & Jones Corp., Wilmington, Del.

L. W. Harris, Link-Belt Co.

R. J. Keeley, Ajax Metal Co.

John H. S. Spencer, H. W. Butterworth & Sons Co., Bethayres, Mont. Co., Pa.

Wisconsin Chapter

Meetings—3rd Friday, monthly, Schroeder Hotel, Milwaukee.

Chairman—Roy M. Jacobs, Standard Brass Works.

Vice-Chairman—Wm. J. McNeill, Federal Malleable Iron Co.

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Walter Gerlinger, Walter Gerlinger, Inc.

R. J. Kelly, American Skein & Foundry Co.

R. S. MacPherran, Allis-Chalmers Mfg. Co.

A. C. Ziebell, Universal Foundry Co., Oshkosh.

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H. L. Martin, Vulcan Foundry Co., Oakland.

M. M. Morison, Balfour, Guthrie & Co., Ltd., San Francisco.

R. E. Noack, Monarch Foundry & Engineering Corp., Stockton.

W. A. Schimmelpfennig, California Foundries, Inc., Oakland.

M. G. Wilson, Wilson & Nutwell, Fresno.

Birmingham District Chapter

Meetings—3rd Friday, monthly, Tutwiler Hotel, Birmingham.

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Directors—W. E. Curran, Republic Steel Corp.

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Frank Hamilton, Alabama Pipe Co.

J. M. Franklin, Central Foundry Co.

J. E. Reynolds, U. S. Pipe & Foundry Co.

W. L. Roueche, Sr., McWane Cast Iron Pipe Co.

L. N. Shannon, Stockham Pipe Fittings Co.

Buffalo Chapter

Meetings—1st Monday, monthl^y, King Arthur's Restaurant, Buffalo.

Chairman—M. W. Pohlman, Pohlman Foundry Co., Inc.

Vice-Chairman—W. J. Corbett, Atlas Steel Casting Co.

Treasurer—R. K. Glass, Republic Steel Corp.

Secretary—J. R. Wark, Queen City Sand & Supply Co.

Directors—J. P. Begley, Pratt & Letchworth Co., Inc.

T. H. Burke, Otis Elevator Co.

J. McCallum, McCallum-Hatch Bronze Co.

V. M. Mazurie, Buffalo Foundry & Machine Co.

W. S. Miller, Chas. C. Kavin Co.

Lynn Reynolds, Worthington Pump & Machinery Co.

R. T. Rycroft, Jewell Alloy & Malleable Co., Inc.

Southern California Chapter

Meetings—4th Thursday, monthly.

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Secretary—M. S. Robb, Bethlehem Steel Co., Los Angeles.

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S. R. Kimberly, Los Angeles Steel Casting Co., Los Angeles.

D. E. Lingenfelter, Quality Foundry Co., Los Angeles.

G. W. Merrefield, Kay-Brunner Steel Products Co., Los Angeles.

J. H. Wilkins, Dayton & Waldrip Co., Los Angeles.

J. E. Wilson, Climax Molybdenum Co., Los Angeles.

Metropolitan New York-New Jersey Chapter

Meetings—1st Monday, monthly, Essex House, Newark, N. J.

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Vice-Chairman—W. E. Day, International Motor Co., New Brunswick, N. J.

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W. A. Phair, Iron Age, New York, N. Y.

J. W. Reid, Robins Conveying Belt Co., Passaic, N. J.

Sam Tour, Lucius Pitkin, Inc., New York, N. Y.

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W. L. Davy, W. L. Davy Pump Co., Rockford, Ill.

W. E. Goff, J. I. Case Co., Rockford, Ill.

H. F. Halverson, Beloit Foundry Co., Beloit, Wis.

Eli Johnson, Greenlee Bros & Co., Rockford, Ill.

P. A. Paulson, Gunito Foundries Corp., Rockford, Ill.

A. W. Wiegart, Geo. D. Roper Corp., Rockford, Ill.

George Zabel, Fairbanks, Morse & Co., Beloit, Wis.

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D. Cameron, John T. Hepburn, Ltd., Toronto.

N. B. Clarke, Steel Co. of Canada, Ltd., Hamilton.

O. W. Ellis, Ontario Research Foundation, Toronto.

C. H. Ley, Dominion Wheel & Fdries, Ltd., Toronto.

C. C. Macdonald, Fredercik B. Stevens Co. of Canada, Ltd., Toronto.

J. J. McFadyen, Galt Malleable Iron Co., Ltd., Galt.

D. M. Storie, Fittings, Ltd., Oshawa.

Canadian Section

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Vice-Chairman—H. J. Roast, Canadian Bronze Co., Montreal.

Secretary-Treasurer—D. J. McDonald, Dominion Radiator & Boiler Co., Ltd., Toronto.

Directors—Maj. L. L. Anthes, Anthes Foundry, Ltd., Toronto.

Emil Drolet, La Campagnie, F. X., Drolet, Quebec, P. Q.

O. W. Ellis, Ontario Research Foundation, Toronto.

W. C. Fletcher, Canadian Car & Foundry Co., Ltd., Montreal.

J. T. Hepburn, John T. Hepburn, Ltd., Toronto.

J. S. Hoyt, T. McAvity & Sons, Ltd., St. John.

A. C. Neal, Enamel & Heating Products, Ltd., Sackville, N. B.

Frank A. Sherman, Dominion Foundries & Steel, Ltd., Hamilton, Ontario.

A. G. Storie, Fittings, Ltd., Oshawa, Ontario.

January Chapter Meetings

January 9

Buffalo

Tourains Hotel, Buffalo, N. Y.

+

Chicago

Medinah Club

Speaker S. W. UTLEY

+

Metropolitan New York-New Jersey

Essex House, Newark, N. J.

Speaker H. H. JUDSON

+

January 12

Northeastern Ohio

Cleveland Club, Cleveland, Ohio

National Officer's Night

St. Louis

York Hotel, St. Louis, Mo.

J. R. HEWITT—"X-Raying of Castings"

+

January 13

Metropolitan Philadelphia

Engineer's Club, Philadelphia

V. T. MALCOLM—"Alloy Steel Castings"

+

Northern Illinois-Southern Wisconsin

Hotel Faust, Rockford, Ill.

M. A. SCOTT—"Risers"

+

January 16

Quad City

Le Claire Hotel, Moline

FRED J. WALLS—"Alloy Castings"

January 19

Detroit

L. P. ROBINSON—"Development in Core Room Practice"

+

January 20

Ontario

Toronto

DEBATE—"Forehearth"

+

Birmingham

Tutwiler Hotel

Pig Iron and Coke

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Wisconsin

Hotel Schroeder, Milwaukee

"Health and Safety"

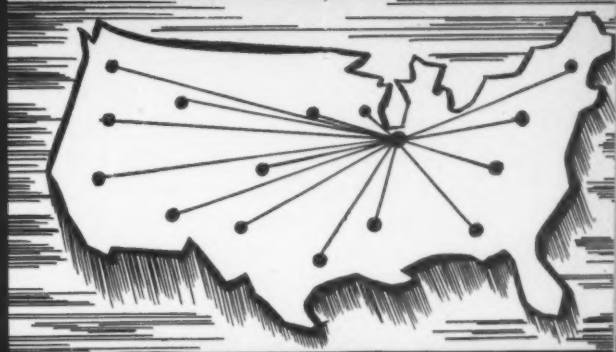
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January 26

Southern California

"Alloys"

Chapter Activities



Southern California Chapter Covers Sand Problems

By M. S. Robb,* Los Angeles, Calif.

SAND problems in the foundry industry featured the November 17 dinner meeting of the Southern California Chapter held at the Clark Hotel in Los Angeles, Calif. J. G. Coffman, chapter chairman, presided. Gary Breckner, ace radio announcer, "KNX," Columbia Broadcasting Company, Hollywood, gave the coffee talk and spoke on "Behind the Scenes in Radio." Mr. Breckner related how radio broadcasting had reached its present success through experimental tests, checks and rechecks, all with a certain amount of headaches. Today, the successful radio program is the result of checking trends, analysis of past errors and as each program goes on the air, it represents a new venture aiming at precision, perfect timing and coordination.

Vocational Education

The guest speaker was George W. MacKenzie, assistant supervisor, Trade and Industrial Education, Los Angeles schools. Mr. MacKenzie outlined the three types of vocational education that the Los Angeles schools system was using. (a) The evening trade extension program held in the various night schools; (b) The preapprenticeship program held at Manual Arts High School, a two-year course for boys who spend the mornings in the school foundry, with the afternoons in the classrooms studying English, etc.; (c) The third type is the apprenticeship system for men who are regu-

larly employed and are paid by their employers to attend the Frank Wiggins Trade School four hours a week.

The speaker then gave the details of the evening extension foundry apprentice training course that would be started shortly, at the request of the local chapter of the A.F.A. This course will be held one night a week, at the Manual Arts High School from seven to ten in the evening. The men eligible to enroll must be recommended by some foundry that they want to continue in foundry work and will attend regularly, completing the course. The instructor selected for the course, Frank Britt, spoke briefly, stating the course would include practical instruction, part in the classroom and part in the Manual Arts foundry.

Following the coffee talk, J. G. Eberhart, foundry superintendent of Kay Brunner Steel Products Company, read a paper submitted by H. O. Behrendsen, F. E. Schundler Co., Joliet, Ill., on the use of Bentonite in molding sands. This paper contained many useful suggestions applicable to both large production plants and small jobbing shops. Mr. Eberhart was formerly in charge of production for Campbell, Wyant and Cannon Company, large Michigan producers of automotive castings, and was very familiar with the problems involved.

Sand Problems Round Table

The next item on the program was the round table forum on "Sand Problems," including gray

iron, steel and non-ferrous practice. L. O. Hofstetter, H. C. Donaldson Company, was discussion leader on gray iron with Jas. E. Eppley, Kinney Iron Works, Walter C. Patterson, General Electric Company of Ontario; Pasquale Arpea, Axelson Manufacturing Company, and Chas. Gregg, Reliance Regulator Corp., cooperating. Discussion included the use of Bentonite fire clay, or similar bonds in gray iron sands, and it was generally agreed that in order to make full use of any clay additions, sand conditioning is essential.

With reference to the durability of natural molding sand, it was agreed that this is a factor governed by the refractoriness of the clay material, which in turn is governed by the amount of lime, iron oxide, alkalis and other fluxing materials present. In an attempt to determine proper clay content of a sand for a particular job, there was a wide difference of opinion and it was finally decided that no recommendation could be made as to clay content without considering a number of other factors, namely moisture content, ramming practice, permeability, pouring temperatures and gating. The importance of sand control in the core room was pointed out and one member reported that his dry permeabilities on cores averaged about 15 per cent higher than green permeabilities.

B. G. Emmett, Los Angeles Steel Casting Company, was discussion leader on steel sands with the assistance of Hayes Schlundt, Columbia Steel Company; Harry E. Blood, sand producer, and E. C. Hummel, Utility Trailer Manufacturing Company. Among the questions commented on was "Is it possible to

*Bethlehem Steel Co., and secretary, Southern California Chapter.

use 100 per cent reclaimed sand in the process of manufacture of steel castings?" After much discussion it was the general opinion that it was entirely possible, provided that the sand grain size was held to rather close limits, such as 75 per cent on two screens and that the iron oxide particles were removed successfully, as is being done in some foundries.

Roy E. Payne, Aluminum Company of America, was the discussion leader on non-ferrous sands. Chas. R. McGraw, Long Beach Brass Foundry, and Fred Edmison, Mechanical Foundries, Inc., cooperated in answering questions. The use of Bentonite in core sand mixes to provide a core of high green strength in order to eliminate the need for bedding-in or driers was described. This would appear to be a satisfactory method for intricate small cores. Surface characteristics of castings as affected by sand fineness was discussed, and it was the opinion of foundrymen that the San Diego sand available in Los Angeles, varies greatly in quality and has a high lime content. Moisture content of the sand and its effect on chills used in molds for aluminum was discussed and it would appear that aluminum foundries have some trouble

from this cause and there is no agreement as to what chill material is most desirable—iron, brass, copper or aluminum. In general, non-ferrous foundrymen in this region have not utilized sand study and control to the extent that many of the ferrous foundries have.

Sixteen local foundries furnished us with copies of their pattern storage record cards with an explanation of how these cards are used. These were mounted and hung up so everyone interested could study these records before and after the meeting.

Credit for the evening's program went to G. W. Merrefield, Kay-Brunner Steel Products Company, chairman of the Program committee. The technical program was considered one of the best and was very ably handled.

The chairman appointed the following men to serve on the committee to handle arrangements for the joint meeting of the Southern and Northern California Chapters to be held at Fresno, Calif., on April 22, 1939: Clyde Hopping, Alhambra Foundry, chairman; Jas. E. Eppley, Kinney Iron Works; L. O. Hofstetter, H. C. Donaldson Company, and Bert Oldfield, Alhambra Foundry.

Co.; L. H. Rudesill, Griffin Wheel Co.; C. E. Westover, Burnside Steel Foundry, and N. F. Hindle, Technical Secretary, A.F.A.

The course will consist of six lectures and two plant visitations, the lectures being held in the auditorium of the Peoples Gas, Light and Coke building, in downtown Chicago, the company generously donating the use of this auditorium as they did last year.

The schedule of the course is:

January 16—"Melting Raw Materials"—Chairman, G. P. Phillips.

February 6—"Molding Raw Materials"—Chairman, H. W. Johnson.

February 20—"Pattern Making and Design"—Chairman, A. W. Gleason, Illinois Steel Corp.

March 6—"Modern Molding Methods and Equipment in the Production of Castings"—Chairman, A. W. Weston.

March 20—"Melting Practices"—Chairman, H. K. Briggs, Western Foundry Co., and L. F. Lottier.

April 3—"Cleaning Methods"—Chairman, Harold L. Henninger, Jr., International Harvester Co.

April 12 and April 22—Plant Visits.

Lecture Course Sponsored

by Chicago Chapter

FOR the fourth year the Chicago Chapter is sponsoring a lecture course on fundamentals of foundry practice. The success of last year's course, which resulted in an average attendance of some 300 at each meeting, has indicated the demand and need for information by the younger men in the industry.

The chapter accordingly appointed a lecture course committee, with J. D. Burlie of the Western Electric Company as chairman, and George A. Davis, Crane Technical High School, as

secretary. In addition to Messrs. Burlie and Davis, others serving are P. V. Martin and V. G. Cornelius, Carnegie-Illinois Steel Corp.; H. W. Johnson, Northwestern Foundry Co.; P. Mote, Greenlee Foundry Co.; J. J. Fox, Wisconsin Steel Corp.; L. F. Lottier, Peoples Gas, Light and Coke Co.; A. W. Weston, Chicago Hardware Foundry Co.; R. W. Schroeder and G. A. Davis, Crane Technical High School; W. C. Packard, National Engineering Co.; L. L. Henkel, Interlake Iron Corp.; G. P. Phillips, International Harvester

Book Notice

Symposium on Steelmaking, special report no. 22, cloth bound brown, 609 pages, published by the Iron and Steel Institute, 4, Grosvenor Gardens, London, S. W. 1. This volume consists of 23 papers on eight selected aspects of steelmaking practice by the acid and basic open-hearth process. The objects of the symposium were defined as follows: "To provide authoritative statements on the various open-hearth processes (including design of plant and practice) employed in the different districts of Great Britain. To set out the differences in practice and the reasons for them. To explain changes in recent years and how present day practice has been developed. To arouse interest in open-hearth practice and provoke discussion on the difference in design and practice. To obtain the formulation of problems requiring elucidation, with a view to the initiation of research, if found desirable, by the Open-Hearth Committee and other bodies."

AMERICAN FOUNDRYMAN

Buffalo Chapter Hears Talk on Intricate Castings of Yesteryears

By J. R. Wark,* Buffalo, N. Y.

M. W. Pohlman, chairman of the Buffalo, Chapter, presided at the December 5 meeting held at the Touraine Hotel, Buffalo, N. Y. Over 65 members and guests saw a magician put on a show that made several sales managers want to sign him up for their sales force. Following the entertainment, Chairman Pohlman announced the big stag night, to be held on January 9, and that dinner, refreshments and entertainment features would be on the program. Next,

the principal speaker of the evening, W. J. Sherman, foundry consultant, Taggart & Co., Philadelphia, was introduced. Mr. Sherman described from his wealth of experience the manner in which intricate castings were made in years gone by and how they are made at present. The address was so interesting that following his talk a general discussion was held on the subject.

*Queen City Sand & Supply Co., and secretary, Buffalo Chapter.

Northern California Chapter Fines Members

THE November regular monthly meeting of the Northern California Chapter was held on November 30 at Hellwig's restaurant, San Francisco, with Chapter Chairman John D. Fenstermacher, Columbia Steel Co., presiding. Due to the absence of Secretary George Kennard, the report of the meeting given below is from the December 3rd issue of Western Steel and Metals. Great fun and serious business were mixed and a good time was had by all.

"To think that a man with so kind a face could have so hard a heart." That is what one foundryman whispered to his neighbor about Chairman John Fenstermacher while the latter was levying two and four-bit fines on everybody in sight. So great was Mr. Fenstermacher's enthusiasm and so trivial the misdemeanors that called for fiscal punishment that the individual members went home seriously impoverished while the Chapter treasury bulged.

Even the emergency absence of Secretary-Treasurer George Kennard failed to decrease the interest and enthusiasm of the membership in an especially good meeting. Introductions included Tom Rolph, importer and exporter, E. J. Lomm of Ingersoll-Rand, and John Bermingham of Houghton. Joe Bray of

Quandt spoke informally on comparative foundry capacity in different districts and Sam Russell reported that Harold Martin would soon be back on the job after his unfortunate accident. Frank Holman, coming in all the way from Sonora for the meet-

ing, tried to tell his fellow-members that he was sorry about something, but every time he got started it cost him 25 cents and, as a result of the Fenstermacher policy of persecution, none of the diners ever did get to know what Holman was sorry about.

Then Al Snow, the sand-man, told about the net results of the Sequoia Club party in October and astonished his co-workers with the accuracy and detail of his auditing and accounting operations. To Ed Welch, of American Manganese Steel, there went final delivery of a pair of silver tongs, part of a prize he won at Sequoia. Next A. W. Allen gave an outline of plans for the December party in Oakland and Clarence Henderson spoke briefly on plans of the national association.

The lights were then dimmed and golfing members saw themselves in action at Sequoia. From this point on the meeting went totally serious and listened to a thoroughly informative and interesting talk, "International Co-operation and Its Effect on Business," by Dr. Clyde A. Duniway.

Some Scenes at Cornell University Foundry Conference Nov. 25 and 26—Sponsored by Buffalo Chapter and Central New York Foundry Group.
(Photos by J. R. Wark)



Pat Dwyer Addresses Metropolitan New York-New Jersey Chapter

By T. J. Wood,* Passaic, N. J.

THE regular monthly meeting of the Metropolitan N. Y.-N. J. Chapter was held on December 5 at the Essex House, Newark, N.J., with Chairman Don Reese presiding. Over 75 members and guests were addressed by Pat Dwyer, Engineering Editor of *The Foundry*, Cleveland, Ohio. The subject of Mr. Dwyer's talk was "Gates and Risers."

The audience's fondest anticipations were realized when Mr. Dwyer generously interspersed his talk with that lively wit for which he is famed. The interest remained just as vital as he described in detail the multitudinous forms of gates and risers currently used in foundry practice. By means of slides the speaker illustrated various ways of gating and risering specific kinds of castings. He also recounted several instances where ingenious methods were em-

ployed to solve difficult casting problems. The direct-riser pouring method, Mr. Dwyer revealed, had been utilized as far back as 1905, although general interest in this system had taken hold only in recent years. The meeting was brought to a close with an enthusiastic discussion. The speaker for the January meeting will be H. H. Judson, of Goulds Pumps, Seneca Falls, N. Y.

Wisconsin Chapter Starts Foundry Class

THE Wisconsin Chapter has for the second year established a twenty-week foundry instructional class with weekly meetings. One section is to be devoted to ferrous subjects and a second to non-ferrous subjects. These are under the direction of the chapter's committee on vocational guidance, and will be held at the Milwaukee Vocational

School. Ernest Henry of the Nordberg Manufacturing Co. and Adolph Schott, Standard Brass Works, will conduct the non-ferrous course.

Southern California Plans Foundry Conference

THE Southern California Chapter reports that it is to hold an all-day foundry conference on March 24, in place of the regular monthly meeting. Technical sessions in the morning and afternoon are to be divided into meetings for steel, non-ferrous and gray iron discussion, with a conference dinner in the evening. One of the Southern California technical universities will be host to the conference.

Junior Foundrymen Demonstrate Their Ability

ON Wednesday evening, December 7, at the Crane Technical High School, members of the Junior Foundrymen of America held an open house for their families and friends. The lads demonstrated their efficiency in molding, coremaking, melting, testing and other fields of the foundry industry. Some thirty odd A.F.A. members of the Chicago district and the stream of visitors were amazed at the workmanship shown by the boys. Their demonstration and the comments of the visitors definitely proved that G. A. Davis, R. W. Schroeder and other members of the staff of Crane Technical High School had done a mighty fine job in training these future foundrymen, who are enrolled in the special foundry course operating under the Smith-Hughes law. The local chapter has a committee, under the chairmanship of A. W. Gregg, Whiting Corp., which is aiding this group of boys in their monthly meetings. The Junior Foundrymen of America is operating under a State charter granted last spring.

AMERICAN FOUNDRYMAN

*Robins Conveying Belt Co., and secretary, Metropolitan N. Y./N. J. Chapter.

Junior Foundrymen Hold Open House.



Gezelius Reviews Radiography Developments Before Philadelphia Chapter

By J. T. Fegley,* Philadelphia

THE Metropolitan Philadelphia Chapter continued to maintain its splendid attendance record at its December 9 meeting with about 150 present. Chapter Chairman Harold Henszey presided and introduced the after dinner speaker, Charles H. Grakelow, president, Poor Richard club, and former director of Public Welfare, Philadelphia. His talk on citizenship was fascinating and one long to be remembered. The technical speaker of the evening, R. A. Gezelius, metallurgist, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., was introduced by Norman L. Mochel of the Westinghouse Electric & Mfg. Co. Mr. Gezelius is unquestionably one of the foremost authorities in the country today on radiography and he presented this highly technical subject in a most pleasing and simple manner and illustrated his talk with many interesting slides. He commented that specifications today are becoming more difficult, all methods of non-destructive testing are of greater importance than ever before. Radiography is, therefore, creating more interest than at any previous time. Practically every technical society now has a committee studying this subject which a few years ago was not considered of much importance generally.

In order to appreciate radiography and interpret the results obtained, it is essential to know something of the fundamental principles involved. Gamma rays and x-rays are members of a family of wave motions known collectively as the electro-magnet spectrum. These rays have several things in common: they all travel in straight lines and at the same speed (186,264 miles per sec.), they are not affected by electric or magnetic fields and, the shorter wave lengths at

least, all affect a photographic plate. These rays, which include radio waves, infra-red light, ultra-violet light, as well as x-rays and gamma rays, differ in only one fundamental manner, and that is in wave length. All other physical differences noted are dependent upon this difference in wave length.

As the wave length becomes shorter, these rays will penetrate greater thicknesses of material, as fewer rays will be absorbed while passing through the material. The production of a radiograph depends entirely upon this differential absorption of the rays. The rays passing through a thick portion of the casting will be absorbed to a greater

degree than those passing through thin portions of the test piece. Thick or dense portions will, therefore, appear as light areas on the radiography, and thin, or less dense portions, will appear as dark areas. This effect can be illustrated most effectively by examining a few samples which have been radiographed, and then sectioned so that the discontinuities are revealed.

Radiography, like all testing methods, has its limitations. It will not reveal any defects, the depth of which is less than 2 per cent of the total thickness. Nor can it be depended upon to show fine porosity in all cases. The greatest use of radiography at the present time is as an inspection medium. This is unfortunate, for its greatest field is that of a production tool which will assist in correcting manufacturing faults, and thus the production of better products.

Second Regional Two-Day Conference Planned by Wisconsin Chapter

THE Wisconsin Chapter committee organizing the second annual two-day foundry conference met December 16. The days set for the conference are February 16 and 17. The place will be the Hotel Schroeder, Milwaukee, the same as last year. The committee developed final plans for the conference which is to be sponsored jointly by the Wisconsin Chapter and the Department of Mining and Metallurgy, University of Wisconsin.

Charles I. Wesley of Wesley Steel Treating Company and Professor E. R. Shorey of the University are serving as co-chairmen of the conference. From the report on advance registrations and interest shown, it is estimated that well over 500 registrations will be received. The conference will be limited, however, to 500 persons.

A tentative program was submitted by R. S. MacPherran, Allis-Chalmers Mfg. Co., in charge of gray iron; Edward Meyer, Chain Belt Co., charge of

malleable; Dave Zuege, Sivyer Steel Castings Co., charge of steel; Oscar Frohman of Ampco Metal Company and B. D. Clafey of General Malleable and Werra Aluminum Corp. in charge of non-ferrous.

The conference will open at 9:00 A. M., February 16, with a joint meeting in the Crystal Ballroom. The speaker will be Dean Ellis Johnson, University of Wisconsin. The program for the balance of the conference will be as follows:

February 16

10:30 A. M. Special Sessions—Gray Iron, Malleable, Steel and Non-Ferrous.

12:00 Noon. Lunch and Joint Meeting in Crystal Ballroom. *Subject:* Flirting with New Patterns, by L. W. Rogers, College of City of New York.

1:30 P. M. Special Sessions—Gray Iron, Malleable, Steel and Non-Ferrous.

3:30 P. M. Joint Meeting in Crystal Ballroom. *Subject:* Job Evaluation, by Charles

*North Brothers Mfg. Co., and chairman, Publicity Committee, Metropolitan Philadelphia Chapter.

Pendock, Le Roi Co., Milwaukee.

6:30 P. M. Conference Dinner and Regular Chapter Meeting. *Speaker:* William Beard of Atlanta, Ga.

February 17

9:00 A. M. Special Sessions—Gray Iron, Malleable, Steel and Non-Ferrous.

10:30 A. M. Special Sessions—Gray Iron, Malleable, Steel

and Non-Ferrous.

12:00 noon. Lunch and Joint Meeting in Crystal Ballroom. *Speaker:* Representative of University of Wisconsin.

1:30 P. M. Joint Meeting in Crystal Ballroom. *Speaker:* M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill.

3:30 P. M. Special Sessions—Gray Iron, Malleable, Steel and Non-Ferrous.

Ontario Chapter Sees Foundries Around the World

By G. L. White,* Toronto, Ont.

AT the meeting of the Ontario Chapter on November 25 at the Rock Garden Lodge, Hamilton, W. F. Piper of Beardsley & Piper Company, Chicago, presented, through the media of motion pictures and descriptive comment, information on foundries in many corners of the globe. In addition to foundry views the pictures covered much of the scenic beauty of a number of countries visited by the speaker.

The chief interest of the foundry travelogue centered in the contrasts between the methods of operation in some of the most up-to-date foundry plants in the world and those observed in some of the more primitive establishments. In order to secure the pictures and information necessary to present these contrasts the speaker traveled about forty thousand miles, visiting Hawaii, Phillipine Islands, Japan, China, East Indies, Australia, Malay States, Indo China, India, Palestine, Syria, Greece, Italy, Switzerland, France, Belgium, Holland, Denmark, Norway, Sweden, Great Britain and Ireland. He saw all types of foundries in operation and studied the founder's art of the past as represented by cast metals objects preserved in temples and other repositories of ancient civilizations.

Amongst the pictures which perhaps best brought out the

contrast between the old and the new in foundry operations were those of the Irrawaddy Flotilla Company foundry in Rangoon

and of the Allis-Chalmers plant in Milwaukee, Wis. In the latter plant were shown sand slingers, modern molding, and materials handling equipment and all the types of mechanism that contribute to the efficiency and productivity of the large foundry. In the plant at Rangoon, although the essential operations of good founding are accomplished, the labor of man and beast is not spared. Materials are screened on a hand screen worked by three men, two doing the shaking and the third shoveling. A heavy, cylindrical stone pulled in a circular path by two oxen is used in the mulling of facing, and core sand and clay for loam molds and for daubing the cupola. Molding is all done on the floor by molders who sit at their work.

M. J. Gregory Addresses Chicago Chapter

By L. L. Henkel*, Chicago

ON DECEMBER 9 the Chicago Chapter held their third meeting of the 1938-1939 season at the Medinah Club, with an attendance of approximately 200. C. E. Westover, vice-chairman of the Chapter, presided over the meeting in the absence of Chairman L. H. Rude-sill.

M. J. Gregory, factory manager of the Caterpillar Tractor Company, gave another one of his very interesting and instructive talks illustrated with slides. He discussed freely phases of his operation, laying particular emphasis on proper kinds and weights of material entering into his cupola operation, even going so far as to reweigh the scrap material. In charging the materials, he advocates small charges insuring more intimate mixtures as well as adding the limestone and coke by a center cone charging bucket.

At their plant they make approximately 3,500 different castings weighing from one pound to 3,200 pounds, for their diesel engines and Caterpillar tractor parts. Alloys consisting of cop-

per, nickel, chromium and molybdenum are added varying from 0.2 to 3.50 per cent. The carbon ranges from 2.80 to 3.25 per cent. Due to a desired high melting temperature of 2890 to 2900° F., a ratio of 7.2 to 1 for iron to coke is maintained.

Mr. Gregory had on display various liners and other parts about which he discussed quite freely. For these he maintains high risers and on one of his liners a wall of $\frac{3}{4}$ to $1\frac{1}{2}$ in. insures perfect castings, although obtaining a slightly higher scrap loss. He discussed a number of his difficulties and experiences in such an enlightening manner that everyone felt it was really an evening well spent.

Mr. Gregory complimented the Chicago group on their good showing of the apprentices in attendance. Particular emphasis was given to the training of the younger men, the apprentice, and the fact that the first Junior Foundrymen's organization was formed here.

J. D. Burlie gave a short review of the 1939 lecture course, which starts on January 13, 1939. Those who desire to enroll may do so by sending their

*Canadian Metals and Metallurgical Industries, and official reporter, Ontario Chapter.

*Interlake Iron Corporation, and secretary, Chicago Chapter.

registration to G. A. Davis, 6448 S. Hoyne Ave., Chicago, Ill.

A number of distinguished visitors were present. They were A.F.A. Past-President H. Bornstein of Deere & Co., Moline; C. E. Hoyt, Executive Vice-

President of A.F.A.; Thomas Kaveny of Herman Pneumatic Machine Co., and Norman F. Tisdale of Molybdenum Corporation of America, both of Pittsburgh. The Chicago Chapter hopes that these visitors will come more often.

W. F. Piper Speaks Before Birmingham Chapter

By W. O. McMahon,* Birmingham, Ala.

THE second fall meeting of the Birmingham Chapter, Birmingham, was held November 18 at the Hotel Tutwiler, with Chapter Chairman C. B. Saunders, Tennessee Coal Iron & Railroad Co., Birmingham, presiding. Foundrymen and their friends viewed the film on "Foundries Around the World," taken by W. F. Piper of Beardsley & Piper Co., Chicago, while on a recent world tour. In order to give a comparison of foundry technique practiced throughout the various countries, stills from some of the foundries in India, China and other countries were shown, followed with pictures of modern foundries. Mr. Piper

next showed a film that depicted the life on some of the South Sea Islands, and in several thriving Australian cities. Following the lecture, questions were asked regarding foundry practice in various countries, evidencing that members were well pleased with the film and talk by Mr. Piper.

A business meeting was held after the lecture. The program chairman reported on the program for the January meeting, and also stated that progress was being made on the plans for the seventh annual regional meeting, to be held on February 23 and 24, 1939.

*Gloss-Sheffield Steel & Iron Co., and secretary-treasurer, Birmingham Chapter.

Chapters Hold Christmas Parties

Wisconsin

THE December meeting of the Wisconsin Chapter was given over to a stag dinner in the Crystal Ballroom of the Hotel Schroeder, Milwaukee. The affair, held on the 16th of December, was under the direction of Entertainment Committee Chairman Harry Donald, Interstate Supply & Equipment Co. An excellent attendance of 475 members and guests participated. Music was furnished by an orchestra during the dinner, which was followed by a program of acts and stunts. Prizes of turkeys were given out. The crowd was the largest to ever attend an affair of this kind conducted by the chapter.

St. Louis District

The annual Christmas party of the St. Louis Chapter was held

Tuesday, December 13, at the York Hotel, St. Louis. With door prizes, free beer, a complete floor show was given and a real good time was had by all. In addition to the show, Ed. H. King of Hougland & Hardy, Inc., Evansville, managed to get in an interesting talk on molding sand.

Southern California

The Southern California Chapter went to unusual lengths to publicize their "Second Annual High-Jinks," which was held the evening of December 16, at the Rio Honda Country Club, Downey, Calif. A large attendance was reported. The program for the evening was given in the form of a menu with the items being listed as *First Charge*, the dinner; *The Wind*, story telling time, with a prize

for the most humorous story; *More Coke*, grand raffle drawing; *More Iron*, drawing for cash door prizes; *Flux*, Schnitzel bank; *Tap Out*, stag show, and *Slag*, some impromptu music and a get-together. This all for two bucks.

Northeastern Ohio

The Northeastern Ohio Chapter, which has made an enviable record for a good time at its annual Christmas party, exceeded its record for excellent entertainment and attendance, the attendance being reported as over 650 members and guests. The entertainment program was under the direction of L. P. Robinson, chapter chairman, and sales manager for Werner G. Smith Co. "Robbie" more than met expectations with his program.

Northern California

The Northern California Chapter held its December meeting as a Christmas party jointly with the San Francisco Chapter of the American Society for Metals. Secretary Geo. L. Kennard reports that "a good time was had by all."

Calendar Regional Conferences

February 16-17 — Milwaukee, Hotel Schroeder

Under auspices of Wisconsin Chapter and Dept. of Mining and Metallurgy, University of Wisconsin.

February 23-25—Birmingham, Ala., Hotel Tutwiler

Under auspices of Birmingham Chapter.

March 24—Southern California's first technical conference (Place to be announced.)

April 1—Rutgers University, New Brunswick, N. J.

Under auspices of Metropolitan New York-New Jersey and Metropolitan Philadelphia Chapter.

April 14-15—Michigan State College, East Lansing, Mich.

Under auspices of Detroit Chapter and Michigan State College.

Philadelphia and New York-New Jersey Chapters Plan Joint Conference

THE Metropolitan Chapters, Philadelphia and New York-New Jersey, are planning an interesting all-day conference for Saturday, April 1, at Rutgers University, New Brunswick, N. J. The conference will be along the general line of the regional conferences held by other chapters and will be the first joint conference of these two chapters. In addition to the various interest sessions scheduled, it is being fostered to promote greater acquaintanceship of the foundrymen of this territory.

The tentative plans call for a morning session with papers and discussions on castings from the consumers' and producers' viewpoints. The afternoon session will be devoted to practical discussions of sand control and gating and risering in the production of good castings. The evening dinner meeting program will be developed by the Rutgers University staff, hosts to the conference.

The general committee developing the conference details will be under the chairmanship of W.

B. Coleman, W. B. Coleman Co., and secretary of the Metropolitan Philadelphia Chapter. Other members are:

Representing Metropolitan New York-New Jersey Chapter

T. D. Parker, Climax Molybdenum Co., New York.

W. A. Phair, The Iron Age, New York.

Sam Tour, Lucius Pitkin, Inc., New York.

Representing Metropolitan Philadelphia Chapter

W. C. Hartman, Bethlehem Steel Co., Bethlehem, Pa.

John Howe Hall, steel casting consultant; Philadelphia, and chairman A.F.A. Steel Division.

H. L. Henszey, Carborundum Co., Philadelphia, and chairman of the chapter.

Representative of Rutgers University

W. C. Schulte, professor, Dept. of Mechanical Engineering.

In later issues of the American Foundryman, further details of the program will be given.

Central New York and Ind.-Mich. Chapters Approved by the Board

IT IS with pleasure that an announcement is made of the approval of two petitions for new chapters by the Board of Directors. The first of these is for a chapter in the central New York district centering around Syracuse, the second includes the northern Indiana-southern Michigan territory, with such cities as South Bend, Michigan City, Plymouth, Elkhart, Peru, Benton Harbor, Buchanan, Mishawaka, LaPorte and Warsaw.

Central New York

The Central New York Chapter results from the two foundry conferences held at Cornell University, and an organization meeting will probably be held sometime in January.

Northern Indiana-Southern Michigan

The Michiana Chapter was first considered at a meeting held at South Bend, December 9, at which over 100 foundrymen were present to listen to a talk by M. A. Scott of the Greenlee Foundry Co., Chicago. At this meeting a request for a petition was authorized. The organization meeting will be held at South Bend, the evening of January 18, when Harry W. Dietert will talk on foundry sand control.

The officers and directors for these two chapters will be announced in later issues of *American Foundryman*. These chapters will bring the number of chapters up to sixteen. We welcome them to the growing family of A.F.A. chapters.

Chapter Petitions

Any group of members desiring to form a chapter have the privilege of petitioning the Board of Directors to issue a call for an organizing meeting. Petition blanks will be sent on request from the Association office.

AMERICAN FOUNDRYMAN

Quad City Hears Talk on Foundry Costs

By J. Morgan Johnson,* Moline, Ill.

SOME ninety members of the Quad City Chapter met December 19 at the Blackhawk Hotel, Davenport, Iowa. Chairman M. J. Gregory, Caterpillar Tractor Co., Peoria, presided and, in opening the meeting, commented on the increasing interest in chapter activities throughout the country with considerable increase in membership. Mr. Gregory then introduced Chris Oberlander, Moline, who gave several impersonations as an entertainment feature.

The main speaker of the evening was Frank C. Rutz, vice-president, Gunite Foundries, Rockford, Ill. The topic of his paper was "Cost Plus Profit

Equals Sales." The importance of foundry cost systems was stressed for the successful operation of a foundry with costs, reasonable profits and suitable selling price to customers as the important items to consider. The speaker told, by giving specific illustrations, the headings of costs that should be considered in determining sufficiently accurate costs of castings. Mention was made as to what could be done to determine the base of costs in operating a foundry. Skilled men and steady operations were listed as important cost reducing factors with increasing production and decreasing supervision. Some items of costs are fairly well set, others vary and require close checking.

*Secretary, Quad City Chapter.

Abstracts



Cast Iron

AIRCRAFT. "Production of Cylinders for Private Aircraft Engines," by R. Chavy, *Foundry Trade Journal*, vol. 53, no. 1151, Sept. 8, 1938, pp. 173. This brief article outlines the requirements and practice used in producing an engine for private aircraft use which would be of low price, but of a power rating per unit weight greater than those of existing engines. The engine was air-cooled, with cast iron cylinders and light alloy castings. The following were the cylinder requirements: (1) Very high mechanical strength; (2) High modulus of elasticity; (3) Excellent wear resistance, and (4) High flowing power (fluidity). The following composition was finally adopted: C. 2.8%; Si. 2.0%; Mn. 1.2%; P. 0.6% and Ni 4.2%. Cracks in the fins were avoided by placing the hot castings, covered with sand, in a pit furnace for a night of slow cooling. The wear of these cylinders in service is distinctly less than that of castings in special or treated steels. (C.I.)

ALLOYED. "Nickel-Boron Cast Iron for Resistance to Abrasion," by W. F. Hirsch, *Metal Progress*, vol. 34, no. 3, Sept., 1938, pp. 230-232, 278. A description is given of the development and applications of a cast iron containing nickel and boron. A typical composition consists of 4.0% Ni; 1.0% B; 3.0% C. and .57% Si, which yields a white fracture, somewhat brittle material, but having a monotron (Diamond Brinell) hardness of about 1000. The boron may be added as a nickel-boron alloy, or ferro-boron plus nickel, or by direct reduction of boron in the melt from a thick flux of borax, boric acid or other boron compounds. The nickel acts as a softener, but its effects are lost in the presence of 1.0% boron, the latter being a powerful carbide stabilizer. The alloy melts 100° F. under the eutectic of cast iron, and is applied as an internal liner by a modified centrifugally cast process. It is unusually hard and has exceptional abrasion resisting qualities. Used in cylinder sleeves, machine tool bushings, dies for drawing and stamping, gages, etc. (C.I.)

ALLOYS. "Diesel Engine Metals," by R. W. Maughan, *Metallurgia*, vol. 18, no. 106, August, 1938, pp. 123-124. Metals employed in the production of Diesel engines are briefly discussed. Cast iron predominates and attention is directed to the use of nickel for improving the quality of castings. Reference is made to bearing metals and some compositions are given. (C.I.)

CHROMIUM. "Chromium Cast Irons," by E. K. Smith, *Metal Progress*, vol. 34, no. 5, November, 1938, pp. 563-568. Chromium is a carbide stabilizer, decreasing the number and size of graphite flakes and favoring the formation of more and finer pearlite. These effects on the microstructure cause an increase in tensile and transverse strengths and hardness. The carbides formed are extremely stable at high temperatures, and thus result in

higher strength at elevated temperatures, and in less growth after repeated heatings. The greatest tonnage of alloy irons made in this country are the low nickel-chromium irons used for automotive cylinder blocks and other gas engine parts. The paper discusses low chromium irons (chromium up to 3.0%), microstructure, applications for resistance to wear and for resistance to heat. High chromium cast irons are also discussed. 3.0 to 12.0% chromium not used extensively commercially; 12.0 to 20.0% chromium alloys are used in considerable quantities for resistance to oxidation and abrasion. The 22.0 to 34.0% chromium alloys give good service in applications where abrasion, oxidation and corrosion are all present at high temperatures, as in cement mills. (C.I.)

CUTTING. "Flame Cutting Cast Iron," by C. H. S. Tupholme, *Foundry Trade Journal*, vol. 53, no. 1152, Sept. 15, 1938, pp. 203-204. The principal reason for flame cutting cast iron in preference to other methods is usually that of speed. The older methods for cutting this material, such as drilling, chipping or sawing, appear doubly tedious in comparison with the relatively short time required for doing similar work with the flame. Cast iron cutting requires a somewhat different technique from that used in cutting steel, although the equipment is substantially the same. The difference lies mainly in the manipulation of the blowpipe, the flame adjustment, and in the handling of the work in general. Type of flame, some practical limits, use of aluminum, oxygen lance cutting and fire precautions are discussed. (C.I.)

ENAMELING. "Scientific Aids to Control in Vitreous Enameling," by J. G. Pearce and G. T. O. Martin, *Foundry Trade Journal*, vol. 59, no. 1159, Nov. 3, 1938, pp. 333-338. Control methods in vitreous enameling can be divided into three classes, dealing with (1) the raw material of the process, (2) the enameling process itself, and (3) the finished product. However, as this could not be covered in one paper, the authors reported on the third class only. With their explanation of various testing methods, the authors give a number of drawings and curves. (C.I.)

ENGINEERING. "Cast Iron in Engineering Construction, V," by J. L. Frances, *Iron and Steel Industry*, vol. 12, no. 1, October, 1938, pp. 17-22. A portion of this article deals with growth of cast iron. The following points affect permanent growth: (1) Expansion due to graphitization; (2) Corrosion and oxidation; (3) Thermal gradients tending towards differential expansion and contraction, thus facilitating crack propagation whereby gases can penetrate into the material; (4) Phase or allotropic changes involving rearrangement of structural constituents with volume modification, and (5) Pressure exerted by occluded gases at elevated temperature. These factors are discussed. The following topics are also covered: Chemical composition and growth; castings and

creep resistance; equi-cohesive temperature, slip interference theory; use of cast iron for elevated temperatures; the property of hardness; microconstituents and hardness; hardness limit for machining, and wear of cast iron. (C.I.)

GRAPHITIZATION. "Theoretical and Practical Significance of Graphitization in Cast Iron," by E. Piwowarsky, *Foundry Trade Journal*, vol. 53, no. 1151, Sept. 8, 1938, pp. 181, 184. Gray cast iron as a casting material has always occupied a prominent position in the cast industry, not only because of its cheapness, good fluidity, and good machinability, but will continue to be used on account of such specific properties as wear resistance, high compressive strength, its good vibration damping properties, high notch strength, relatively high fatigue value, elastic resilience, good corrosion resisting properties, good adhesion of its oxide and scale films, etc. All of these properties of gray iron are connected in some form or other with the presence of the graphite inclusions. Since flakes tend to weaken the matrix, this has led to two familiar methods of improving the mechanical properties of unalloyed irons, (1) reducing the amount of graphite, and (2) producing graphite inclusions in a most suitable form. It is pointed out that attempts to exceed 48,000 lbs. per sq. in. tensile strength, which value is designated as a maximum value for unalloyed and improved cast irons, are only calculated to damage the foundry industry, to increase the costs of manufacture and to alienate the designer from one of the most valuable metal materials. Included is a discussion on interpretation of laboratory tests, major composition field of cast irons, and ladle additions and slag control. This article is good. (C.I.)

INCLUSIONS. "Inclusions in Cast Iron," by F. W. Scott and T. L. Joseph, *Metals and Alloys*, vol. 9, no. 11, November, 1938, pp. 299-302. This article is the second in a series dealing with a study of the oxide inclusions or non-metallics in gray irons and their relation to graphitization. The first article appeared in the July and August issues. This article deals with the analysis of the oxides. The third article will discuss the effect of caustic soda treatment upon the oxide analysis, graphite refinement, and physical properties. In order to illustrate his points more clearly, the author gives various microphotographs containing inclusions. The entire paper should be of help to foundrymen in producing better castings. (C.I.)

PROPERTIES. "A System for the Investigation of the Mechanical Properties of Cast Iron," by J. E. Hurst, *Metallurgia*, vol. 18, no. 108, October, 1938, pp. 197-200. In recent years there has been considerable progress in the development of cast iron; its economic usefulness, however, is largely dependent upon its special mechanical properties, which has led to an intensive study of the various attributes of the strength properties of this material. The usual methods of testing do not give data for all of its qualities;

for many applications, for instance, it is important to study the elastic characteristics of cast iron. In this article, the author describes a system of mechanical testing which could be applied as a basis for acceptance tests. (C.I.)

RESEARCH. "Cast Iron Research and the Gas Industry," by J. G. Pearce, *Foundry Trade Journal*, vol. 53, no. 1152, Sept. 15, 1938, pp. 199-201; no. 1153, Sept. 22, 1938, pp. 216-217. Cast iron alloys interest the gas engineer from four service aspects, involving mechanical strength, heat resistance, corrosion resistance, and wear and erosion resistance. Service requirements dictate the choice of material, which in some applications is comparatively simple, while in others mutually antagonistic requirements necessitate a compromise. Progress in each of these directions is indicated. (C.I.)

SHRINKAGE. "Shrinkage and Contraction of Cast Iron," by A. A. Timmins, *Foundry Trade Journal*, vol. 53, no. 1152, Sept. 15, 1938, pp. 191-193. Troubles met in castings due to shrinkage may be classified under three main types: (1) the common draw, (2) sink or depression on top of thick section, and (3) cracked or warped castings (light sections). The author attributes these defects to (a) composition, (b) temperature of pouring, (c) molding conditions, running, etc., and (d) type of casting. The effects are due to volume change which takes place when cast iron cools from the liquid condition to room temperature. The three types of shrinkage, (1) liquid, (2) solidification and (3) solid, are discussed. Minimum shrinkage is obtained in a gray iron when the iron is of eutectic composition with respect to carbon and is due to the eutectic carbon being precipitated during solidification and causing an expansion. High pouring temperature tends to lower the temperature gradient by warming the mold, and hence allow more feeding. A number of practical factors are discussed. (C.I.)

Castings

COPPER-STEEL. "Copper-Steel Castings," by M. Alexander, *Foundry Trade Journal*, vol. 59, no. 1160, Nov. 10, 1938, pp. 345-348. This is an extract from the Third Report of Steel Castings Research Committee and presented at the annual meeting of the Iron and Steel Institute of London. The author investigated ten steels of which the chemical elements were different. He lists the various operations performed on the steels and the resulting physical properties. This article should be of interest to those using or intending to use copper in steel. (C.)

HEAT RESISTING. "Heat Resisting Castings Up to 35% Nickel," by R. J. Wilcox, *Metal Progress*, vol. 34, no. 4, October, 1938, pp. 342-343. A very brief article, giving data on the industrial applications of these alloys, variation in composition, melting and founding of alloys, especially the centrifugal casting process. (C.)

HEAT RESISTING. "Heat Resisting Castings, 38 to 70% Nickel," by H. H. Harris, *Metal Progress*, vol. 34, no. 4, October, 1938, pp. 343, 346. Short article. The characteristics of nickel are briefly stated, also the effect of additions of iron, chromium and carbon. The higher nickel-chromium alloys are resistant to "heat-fatigue" and embrittlement by carbon penetration. Recent developments in the high nickel-chromium series are primarily the addition and control of secondary ingre-

dients for modifications in physical properties for special conditions. Improvement in foundry practice is also representative of metallurgical advance. (C.)

MOLD. "A New Water-Cooled Mold—Casting Non-Ferrous Metal Horizontally," by S. F. Erickson, *The Metal Industry* (London), vol. 53, no. 11, Sept. 9, 1938, pp. 251-252. This article describes a new mold in which non-ferrous metals produced for rolling are cast horizontally in a mold which is insulated at the edges and water-cooled at the bottom. It is claimed that the heat transfer from the liquid metal to the water-cooled base plate is equal over the whole area of the plate and that, therefore, the shrinkage and solidification of the slab proceed uniformly, being distributed over the whole of its area. This, it is claimed, eliminates shrinkage cavities and piping. (C.)

NON-FERROUS. "Non-Ferrous Castings. The Proper Use of Runners and Risers," by F. Dunleavy, *The Metal Industry* (London), vol. 53, no. 13, Sept. 23, 1938, pp. 299-302. The author deals with some difficult problems encountered in the casting of phosphor bronze, manganese bronze and aluminum. Detailed description of the best methods of gating and feeding the castings is given. Ten figures are given for illustrative purposes. (C.)

STEEL. "Progress in Automotive Steel Castings," by R. H. McCarroll, *The Foundry*, vol. 66, no. 10, October, 1938, pp. 30-31, 72, 74, 77. Also, "The Metallurgical Story of the Ford Centrifugally Cast Steel Gears," by E. F. Cone, *Metals and Alloys*, vol. 9, no. 10, October, 1938, pp. 275-279. This paper was presented at the A.F.A. fall technical conference held at the University of Michigan. It is somewhat more extended than the article which appeared in a June issue of *Automotive Abstracts*. (C.)

STRUCTURE. "Refinement of the Structure of Castings," by A. Portevin, *Foundry Trade Journal*, vol. 59, no. 1160, Nov. 10, 1938, pp. 354-356. This is the second of a series of articles on the refining of the structure of castings. The principal factors which influence crystallization may be classified as follows: (a) Mechanical, (b) Thermal, (c) Physical, (d) Chemical and Physico-Chemical. Taking each one of these sub-headings, the author describes how they affect the structure of a metal. This article will be continued in the next issue. (C.)

Core Making

See Sand.

Heat Treatment

CAST IRON. "Heat Treatment of Cast Irons," by G. P. Phillips, *Metal Progress*, vol. 34, no. 4, October, 1938, p. 450. Very short article. Heat treatment of cast irons other than malleable can be resolved into three broad classifications: (a) treatment for stress relief; (b) softening; (c) hardening. The first and second types of treatment are often combined (to relieve stresses and improve machinability). Frequently, some castings are given all three types of treatment. These types of heat treatment are discussed. It is pointed out that irons are usually pearlitic as cast and generally are alloy irons fairly low in total carbon (2.80 to 3.20). (H.)

Malleable

DUPLEXING. "Duplexing Malleable Cast Iron," by G. A. Schumacher, *The Foundry*, vol. 66, no. 10, October, 1938, pp. 22-24,

88, 90. A brief summary is given of the production of quality malleable iron by melting in a cupola and refining in a coal fired air furnace. Two cupolas may operate simultaneously to produce a total of twenty tons of iron per hour. Metallurgical control is maintained by carbon and manganese analyses every fifteen minutes and silicon and sulphur every half hour. Method of charging, lining of air furnace and dimensions of bottom (brick) are discussed. This plant is in a state of transition from the old heap type of molding to the mechanized line type of casting production. Castings are being produced by both methods. Annealing is done in 40-ton batch powdered coal fired ovens. Methods of sand control and core mixtures are also discussed. The size of cast produced varies from a fraction of an ounce to pieces weighing more than fifty pounds per casting. (M.)

PROGRESS. "Malleable Iron Progress," *American Machinist*, vol. 82, no. 20, Oct. 5, 1938, pp. 912-914 and 33. A review of the discussion on this subject at the 1938 annual convention of the A.F.A. Three factors may be considered as primary causes for continued increase in the use of malleable castings: (1) development in the short cycle annealing methods, (2) increasing use of pearlitic malleables, and (3) control of furnace atmospheres in the anneal. The electric furnace pointed the way for cutting annealing time to 30 hours. Pearlitic malleable is being produced in 6 hours anneal. Some irons are completely malleabilized in less than 15 hours. Analysis of iron for short anneal Si. 1.60—1.90%, C. 2.0 to 2.4%, Mn. 0.25 to 0.45%. The sum of carbon and silicon should be about 3.90%. Gas fired radiant tubes are also used for annealing. The annealing cycle in this particular furnace is briefly described. Atmospheric control is also discussed. (M.)

Melting

DESULPHURIZING. "Desulphurizing Pig Iron by Ladle Treatment with Soda Ash, or Caustic Ash, and a Non-Technical Discussion of the Reactions of Alkali Slags," by G. S. Evans, *Metals Technology*, vol. 5, no. 6, September, 1938, pp. 1-15; also *Foundry Trade Journal*, vol. 53, no. 1156, Oct. 13, 1938, pp. 269-271, 267. The purpose of this discussion is to illustrate (1) the importance of selecting the reagent in relation to the character of the metal to be treated, and the extent of desulphurizing required, (2) the necessity of correct equipment design and layout for carrying out the process in an efficient manner, (3) the importance of carrying out the operations strictly in accordance with a fixed schedule, found by experience to produce efficient and consistent results. Various phases of the process are discussed. (Me.)

MALLEABLE. "Some Unusual Aspects of Malleable Iron Melting," by A. L. Boeghold, *Metal Progress*, vol. 34, no. 5, November, 1938, pp. 557-562, 608. Excerpts from the Edward deMille Campbell Memorial lecture for 1938, representing observations made on experimental melts of malleable iron with regard to the oxide formed. For example, cupola melted irons show considerably less carbide retention than the same iron after heating in the electric furnace. The size of mottles formed in heavier sections is different. Electric furnace irons could, therefore, contain more silicon for a given carbon content and still produce a white fracture. There are indications that moisture and hydrogen have a positive power to over-

come the graphitizing influence of increased carbon and silicon. Under certain conditions, iron oxide acts as a graphitizer. During malleablizing, iron oxide tends to slow up annealing by causing fewer temper carbon spots and hence greater distances for the carbon atoms to travel during the annealing period. The importance of melting stock is stressed. (Me.)

NON-FERROUS. "Melting Copper Base Alloys," by N. K. B. Patch, *The Foundry*, vol. 66, no. 9, September, 1938, pp. 34, 74. Practical procedure of melting is given with fundamental reasons for such procedure. It is pointed out that any high copper alloy is "hungry" for unburnt gases and will absorb them readily. It is further inferred that these gases usually exist in local points in a furnace, even the general flame conditions are on the oxidizing side. To expose copper base metals to higher temperatures or longer time than is necessary, is foolish and dangerous. Use of slags is encouraged. Deoxidizers and methods of deoxidation are also discussed. Uniformity of product demands uniformity of practice. (Me.)

Sand

CONTROL. "How Does Your Sand Behave," by H. W. Dietert, *The Foundry*, vol. 66, no. 9, September, 1938, pp. 26-28, 62. The object of this article is to familiarize foundrymen with the way in which molding sands and cores may be tested at high temperatures to determine how the sand will behave when heated to temperatures identical to that of molten metal. Laboratory tests are described which simulate practical conditions in the tendency to produce mold surface cracks, scrabs, rat tails, cuts, etc. The article contains four good photographs, three charts and two tables. Article is practical and instructive. (Sa.)

CORE. "Core Making in the Brass Foundry," by N. K. B. Patch, *The Foundry*, vol. 66, no. 10, October, 1938, pp. 29, 84, 86 and November, 1938, pp. 31-32. In this discussion of core sands, binders and mixes, it is pointed out that it is a matter of experiment for each foundryman to determine what type of binder he may prefer for the kind of alloy he is pouring and the kind of work regularly produced. The all important factor is to have a minimum amount of gas forming material and just enough binder to hold the core in true normal shape until the casting has set and then have the core collapse so that it can be removed from the casting readily. Where high pressure is involved, it may be necessary to coat the core with a high temperature furnace cement. Good core practice involves: (1) good permeability, (2) green strength, (3) dry strength, (4) friability (collapsibility), and (5) must resist metal penetration.

The second article is devoted to some of the characteristics of and practices incident to the use of cereal and other water soluble binders in the production of cores. (Sa.)

MOISTURE INFLUENCE. "Influence of Moisture Content of Molding Sand on Strength Properties of Cast Aluminum Test Bars," by C. Gierdziejewski, *Foundry Trade Journal*, vol. 59, no. 1157, Oct. 20, 1938, pp. 289-292. The author states that the factors which influence the strength properties of a sample with a determined chemical composition are: physical composition of metal (ingots of virgin metal, scrap, runners, etc.); order of charging; type of furnace and fuel; treat-

ment of the liquid metal; temperature of casting, and finally the shape of the sample. Of further interest is his citation of other investigators: Longden found bronze cast in green sand molds was of lower density and softer than metal cast in a dried sand mold. Vath, working with gray iron, found that a lower moisture in the sand produced correspondingly lower values in transverse breaking loads and deflection. A third investigation reported a hardening of cast iron when cast in oil-bonded sands (increased thermal conductivity, faster cooling rate). The investigation of the effect of aluminum alloys cast in green sand molds indicated an increase in strength properties with increase in moisture in molding sand. (Sa.)

MOLDING. "Some Fundamental Properties of Molding Sands," by W. J. Rees, *Foundry Trade Journal*, vol. 59, no. 1156, Oct. 13, 1938, pp. 274-276. A practical discussion dealing with the underlying principles which govern the choice of a molding sand for any particular purpose. The most important properties of a molding sand are plasticity, size and shape of grain, nature of grain surface, the green and dry strength, the permeability and the refractoriness. The properties are, to a certain extent, interdependent. Each of the above properties is discussed in detail. The relationship between grain size, surface area of grains and point contacts is stressed, that is, 30 mesh sand per 100 lbs. has just over 3000 sq. ft. of surface area, and the same weight of 120 mesh sand would have a much greater surface area. The point contacts in the 120 mesh would be much greater in number than the coarser grains. There is a great difference in the ability of clean sand grains to hold any bond, especially a clay bond. A slightly roughened grain surface is preferred to a smooth grain. Better still is a sand grain which, while comparatively clean, has attached to its surface the minutest film of iron oxide. Silt or "fines" are very instrumental in lowering the permeability of sands. Bonding clays should be very finely grained in order to produce best results. The article stresses the need of fundamental knowledge of sands as a required step in developing a synthetic molding sand. (Sa.)

RAMMING. "Investigation of the Time of Ramming Sand," by Fr. Broussard, *Foundry Trade Journal*, vol. 53, no. 1151, Sept. 8, 1938, pp. 178-180. Belgian exchange paper presented at the Seventeenth Annual Convention of the French Foundry Technical Association. In this article, the author considers the influence of the working conditions on the ramming of sand and the ramming time. Comparison is also made between the theoretical calculated times and practical tests. (Sa.)

Steel

ENGLISH. "English Steel Making in Practice and in Theory," by C. H. Herty, *Metal Progress*, vol. 34, no. 3, September, 1938, pp. 241-244. A correlation of data presented in the form of papers at the May, 1938, meeting of the British Iron and Steel Institute covering steel making operations and steel making principles in great detail. The author presents a very good review of this symposium. (S.)

FLUIDITY-TEMPERATURE. "Fluidity Temperature Relation of Cast Steel of Various Compositions," by R. J. Sargent and T. H. Middleham, *Foundry Trade Journal*, vol. 59, no. 1159, Nov. 3, 1938, pp. 324-327.

This paper was included as part of the Third Steel Castings Report presented at the autumn meeting of the Iron and Steel Institute in London. The authors describe their experimental data and results obtained when using the Ruff fluidity mold. Included in this article are various curves and data found while experimenting with this fluidity test. (S.)

INCLUSIONS. "Inclusions in Steel from Ladle Linings, Nozzles and Stoppers," by J. B. Austins, *Metal Progress*, vol. 34, no. 5, November, 1938, pp. 583-586. This article is a brief summary of the various papers which were given as a symposium on "Steel Mill Pouring Pit Refractories" before the annual meeting of the American Ceramic Society. The symposium consisted of five papers of which four were by steel men. Each speaker eventually came to a consideration of refractories as a possible source of inclusions in the cast metal. (S.)

MELTING. "Steel Melting," by N. Metcalf, *Canada's Foundry Journal*, vol. 11, no. 10, October, 1938, pp. 6, 24-25. In this paper an outline of the chemistry of the open hearth process and the electric arc furnace are given. The author describes both the basic and acid open hearth processes and gives the resulting equations to illustrate just what is taking place during the melting. (S.)

RAILS. "Compound Cast Rails—Their Manufacture and Advantages," *Iron and Steel Industry*, vol. 12, no. 1, October, 1938, pp. 15-16. Two types of steel are cast under conditions so that they can gradually merge into each other. Details of this procedure are not given. In the compound railroad rail, the rail heads are of an extremely high wear resistance, while the web and foot are of a softer and tough material (less than half as strong). (S.)

REFINING. "Rapid Steel Refining," by D. F. Campbell *Metal Progress*, vol. 34, no. 5, November, 1938, p. 579. Extracts from "Electrical Furnaces in European Steel Workers," fall, 1938, meeting of British Iron and Steel Institute. The time spent in finishing a steel after it is melted in an arc furnace is being reduced from hours to minutes. This is accomplished by agitating the steel with a suitable slag free from oxide of iron. Furthermore, it was found that sulphur could be removed by the use of an ordinary slag of lime and iron ore if temperature were raised and the slag contained a high percentage of lime and low silicon. How far these rapid methods of steel making may be applied without prejudice to quality is to some extent an open question, but for many steels excellent results, as regards general chemical and physical qualities, are obtained, and the steel is definitely as free from non-metallic impurities as steel made by more orthodox methods. (S.)

STAINLESS. "Permanency of the Stainless Steels," by V. N. Krivabok, *Metal Progress*, vol. 34, no. 3, September, 1938, pp. 223-228. This article is a technical discussion on stainless steels in general. The author describes why permanent steels are not permanent and how this can be overcome. He discussed the effects of welding and pinholes on corrosion. The various points are brought out by tables and curves. "Although this manuscript has been written by one man, it represents the combined knowledge and experience of many men from operating, technical and research departments." (S.)

FUNDAMENTAL FOUNDRY INFORMATION

A Partial List of Available A. F. A. Publications

Job Evaluation and Time Motion Study and Job Standardization

Heavy paper binding, 49 pp., 6x9, (1937). Price \$1.00. To members \$0.50.

Proceedings of 1937 convention session on job evaluation and foundry time study, together with discussion. The paper on time study and job standardization outlines methods used in a foundry carrying on jobbing type of work, giving charts of various molding operations. The job evaluation paper describes system used in a large plant to establish a wage rate for each job in the factory.

Practical Job Evaluation for the Small Foundry, by E. L. Roth.

10 pp., 6x9, (1938). Price \$0.20. To members \$0.10.

This paper is a report on a system of job evaluation which is easily understood by owner, manager, foreman and workmen.

Effect of Aluminum on the Properties of Medium Carbon Cast Steel, by C. E. Sims and F. B. Dahle.

Paper binding, 68 pp., 6x9, (1938), 24 illustrations. Price \$0.60. To members \$0.30.

This paper is the result of a comprehensive study undertaken to determine the conditions under which the beneficial effects of aluminum might be obtained without suffering any harmful loss in other properties.

Design of Straightening Equipment for Malleable Iron Castings, by C. W. Weedfall.

22 pp., 6x9, (1938), 17 illustrations. Price \$0.30. To members \$0.15.

This paper records the knowledge gained by experience and study on this subject. Some points covered are (1) Causes of warping and deformity, (2) Effects of straightening, (3) Numerous formulas, (4) Factors governing the design of straightening equipment.

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44 (1936)	624	2.00	6.00
43 (1935)	722	2.00	6.00
41 (1933)	608	2.00	6.00

Graphitization and Inclusions in Gray Iron, by J. W. Bolton.

68 pp., 6x9, (1937), heavy paper binding, 46 illustrations. Price \$1.00. To members \$0.50.

The first part of this paper covers some of the questions relative to graphitization in cast iron. The second part reviews the subject of inclusions.

Pearlitic Malleable Cast Iron

An A.S.T.M. publication. 32 pp., 6x9, (1936). Price \$0.60; to A.F.A. and A.S.T.M. members \$0.35.

Compiled from various sources by a special committee of the A.S.T.M. Covers classification, producer's data on various classes and patent literature. Considered of much value to those interested because published data since 1923 is largely in patent papers.

Symposium on Malleable Iron Castings

122 pp., 6x9, (1931), heavy paper binding. Price \$0.75.

The importance of malleable iron as a material of engineering emphasizes the need of accurate, reliable information upon its manufacture, its properties and other facts of value to the user of the material. Symposium published by A.F.A.-A.S.T.M.

Good Housekeeping in the Foundry and Occupational Disease Legislation.

61 pp., 6x9, (1937), heavy paper binding. Price \$1.50. To members \$0.75.

Proceedings of 41st annual convention, contain information on foot and leg protection, maintenance of safeguards, industrial codes and their applications and essentials of occupational disease legislation.

Steel Castings (A.F.A.-A.S.T.M. Symposium).

Heavy paper binding, 254 pp., 6x9, (1932). Price \$1.00.

A compilation of ten papers giving critical information and data on the properties of practically all classes of steel castings. Includes data on methods of molding, casting, use of alloys and heat treatment. Design and specifications fully treated. Extensive discussion.

Standard Pattern Color Charts

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Recommended colors for wood patterns and core boxes. Approved by Joint Committee and adopted by Division of Simplified Practice, Bureau of Standards. Includes color page suitable for displaying on bulletin board in pattern shop and foundry. Poster 17x11-in.